**Course Description**

Computing and information systems underlie nearly every facet of life in today’s highly-networked societies. Accordingly, there are many paths through the degree programs offered by the School of Computing and Information, each focusing on different aspects of the theories, practices, and applications of computing and information. This course will introduce you to a variety of core principles and important themes that cross-cut this array of computing- and information-oriented disciplines, as well as explore the types of work that individuals educated in these disciplines engage in.

**Learning Outcomes**

By the end of this course, you will be able to:

* Articulate intuitive definitions for each of the “big ideas” discussed in class
* Uncover and differentiate underlying computational and informational aspects of a variety of natural, social, and engineered systems
* Leverage computational and informational abstractions and ideas to navigate the technical and social issues arising at the interfaces between complex, interacting systems
* Identify the similarities and differences in methodology, applications, and abstraction that exist between computational and information disciplines
* Situate computing and information practices within a socio-cultural context
* Develop scripts demonstrating a mastery of basic concepts in the Python programming language (data structures, control flow, functions and modules)
* Navigate Unix-based systems, manipulate files, and execute programs
* Break down and back up work, as well as collaborate with others using a distributed version control system
* Generate, transform, and manipulate data using the Python programming language
* Generate and publish mixed media content on the web using Markdown and Static HTML sites

**Meeting Times**

**Lecture (25064):** Tues/Thurs 1:00 - 2:14, CL 232

**Labs:**

* 28459: Mon 11:00 - 12:50, IS 403
* 27183: Mon 1:00 - 2:50, IS 305
* 25066: Wed 11:00 - 12:50, FKART 204
* 25065: Wed 1:00 - 2:50, IS 305

**Weekly Schedule**

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| --- | --- | --- |
| Week | Topics | Skills Lab |
| 1 | Computing and Information @ SCI  Synthesis activity: Introductions | Intro to Jupyter |
| 2 | What is Information?  Make up: Lab 2 for cancelled Monday sections | Python Part I |
| 3 | What is Computing?  Synthesis activity: Card sorting algorithm | Python Part II |
| 4 | Communication  Synthesis activity: Comparing ICTs | Python Part III |
| 5 | Abstraction and Representation  Area talk: Prof. Annette Vee – Automated Writing and Intelligence | Command Line |
| 6 | Design and Affordances  Area talk: Jay Graham – History of Computing | Version Control |
| 7 | Structure and Function  Synthesis activity: Designing Smart Home Devices | Plaintext and FOSS |
| 8 | Computability and Complexity  Synthesis Activity: Traveling Salesperson Problem | Panas I |
| 9 | Graphs and Networks  Synthesis activity: Networking building exercise | Pandas II |
| 10 | Distributed Knowledge and Computation  Synthesis Activity: Managing a CDN | Data Visualization |
| 11 | Classification and Categorization I  Area Talk: Prof. Tom Hales – Automated Proof | Final Project kick-off |
| 12 | Classification and Categorization II  Synthesis activity: Data collection brainstorm | Final project check-ins |
| 13 | Thanksgiving Break |  |
| 14 | Social implications of computing and information  Area talk: Prof. Prashant Krishnamurthy – Wireless Spectrum | Final project presentations |
| 15 | Grand Challenge | Final project presentations |

**Grade Breakdown**

Your grade in this course will be computed as follows:

* Participation - 10%
* Skills labs - 20%
* Synthesis activities - 20%
* Synthesis essays - 30%
* Final project - 25%

Below, we describe all of the components that we will use to calculate your score. You may notice that the percentages add up to 105%, which is more than 100%. This is because different people learn in different ways, and different people succeed at different forms of evaluation. By structuring the class like this, you will have some leeway, and with enough effort you can earn a high grade without having to perform perfectly on every component of the course.   
  
**Note:** The best way to think about this is that you have 110 chances to get 100 points. This grading scheme does NOT mean that you get 10 "free" percentage points. It means you get 10 "free" *opportunities to earn percentage points*. If you have any questions about how to calculate the grade, you should email me for clarification.

**In-class participation (10%)**

Lectures will involve more than me talking to you as you passively take in information. We will use class time to engage in problem-solving and critical thinking exercises that allow you to learn actively. During lectures, I will administer questions through Top Hat that you will be asked to answer. You may use any device you want. Most of these questions will be graded solely on participation; i.e., you get the points as long as you attempt to answer.   
  
We understand that circumstances will come up, and you may not be able to make it to every second of every class. Thus, if you answer at least 80% of the Top Hat questions, you will get the full 20% of participation points. If you answer less than 80% of the Top Hat questions, you will get an extra 20% added to your score - so for example, if you answered 70% of the Top Hat questions, your Top Hat score would be augmented to 90%.  I do not schedule Top Hat make-up sessions, for the simple reason that it would be a logistical nightmare to try to schedule different make-up sessions for all of the different students who had to miss lectures (or parts of lectures). If you miss a lecture, don't stress, and remind yourself that you have quite a bit of leeway to miss some Top Hat questions without incurring a significant penalty to your participation grade.   
  
**Pre-class reading:** Each week we will link you to some articles that we encourage you to read. Occasionally, we will administer top hat questions based on these readings. These questions will be graded partially on correctness, to reward you for putting in the extra effort. If you miss these questions, it's no big deal - these are just a small part of the Top Hat grade. But if you find yourself on the borderline between different letter grades, you may well regret missing these points on the margins.

**Skills Labs (20%)**

Each week you will complete a skills lab designed to help you build basic fluency in computer programming and software engineering. The skills lab will introduce you to basic tools such as python programming, Jupyter notebooks, markdown, version control, collaborative coding, etc. The UTAs will run lab sections each week in which they teach you new skills, explain the assignment of the week, and help you work through the problems. You do not have to attend the skills lab session, and you do not have to finish it by the end of the session - you can work on it afterwards. But if you value your sleep and social life, I strongly encourage you to take full advantage of these skills lab sessions.   
  
Importantly, you do **not** need any prior programming experience to take this course. The UTAs will assume no coding background, and they will help you build your skills from the ground up. During the first lab section the UTAs will show you how to access the environment that you will use to write and test your code.

**Synthesis Activities (20%)**

A few class will not involve a lecture; instead, you will work in groups of 3-4 to complete an activity that will let you explore one of the course topics in a deeper and more hands-on manner. You will get to work with examples of how each of our big ideas might be used in real-world situations. Each activity will have some sort of write-up that you need to submit on Canvas. The activities are designed so that you should be able to complete and submit the write-up within the 75 minute class period; however, the write-ups will be due a week later, so that you can work on them outside of class if necessary.

**Synthesis Essays (30%)**

You will have three synthesis assignments in which you will have to apply and think more deeply about the big ideas we discuss in class. For these assignments we will provide you with a prompt, and you will submit a 1-2 page write-up. In these assignments, you will need to do some research and cite scholarly articles or books that support your argument. We will grade you on the depth of the exploration of your big ideas, as well as your overall writing style and the clarity of your arguments.

**Final Project (25%)**

At the end of the semester you will form a group with other people in your lab section and work together to determine which Pittsburgh neighborhood is the best. You will be using data from the [Western PA Regional Data Center](http://www.wprdc.org/)

[Links to an external site.](http://www.wprdc.org/) to construct a data-driven argument for your claim. For this project, you will be applying the skills you learned in your skills labs - Python, Jupyter, Git, data science, etc. - to produce a Github repository that includes a README, and a Jupyter notebook that tells a compelling story. You will be graded on how well your final notebook utilized all of the skills you developed in skills labs, as well as the quality of how you present your results. Additionally, about halfway through the project you will have to have a check-in meeting with your UTA to show your progress up to that point. A small component of your final project grade will be based on the quality of this check-in - you will not get full credit if you wait until the last minute to complete the project.

**Health and Safety**

During this pandemic, it is extremely important that you abide by the [public health regulations](https://www.alleghenycounty.us/Health-Department/Resources/COVID-19/COVID-19.aspx)

[Links to an external site.](https://www.alleghenycounty.us/Health-Department/Resources/COVID-19/COVID-19.aspx) , the University of Pittsburgh’s [health standards and guidelines](https://www.policy.pitt.edu/university-policies-and-procedures/covid-19-standards-and-guidelines), and [Pitt’s Health Rules](https://www.coronavirus.pitt.edu/healthy-community/pitts-health-rules). These rules have been developed to protect the health and safety of all of us.  Universal [face covering](https://www.coronavirus.pitt.edu/frequently-asked-questions-about-face-coverings) is required in all classrooms and in every building on campus, without exceptions, regardless of vaccination status. This means you must wear a face covering that properly covers your nose and mouth when you are in the classroom. If you do not comply, you will be asked to leave class.  It is your responsibility have the required face covering when entering a university building or classroom. For the most up-to-date information and guidance, please visit [coronavirus.pitt.edu](http://coronavirus.pitt.edu/) and check your Pitt email for updates before each class.

If you are required to isolate or quarantine, become sick, or are unable to come to class, contact me as soon as possible to discuss arrangements.

**Your Well-Being Matters**

College/Graduate school can be an exciting and challenging time for students. Taking time to maintain your well-being and seek appropriate support can help you achieve your goals and lead a fulfilling life. It can be helpful to remember that we all benefit from assistance and guidance at times, and there are many resources available to support your well-being while you are at Pitt. You are encouraged to visit [Thrive@Pitt](https://www.thrive.pitt.edu/" \o "thrive.pitt.edu" \t "_blank) to learn more about well-being and the many campus resources available to help you thrive.

If you or anyone you know experiences overwhelming academic stress, persistent difficult feelings and/or challenging life events, you are strongly encouraged to seek support. In addition to reaching out to friends and loved ones, consider connecting with a faculty member you trust for assistance connecting to helpful resources.

The [University Counseling Center](http://www.counseling.pitt.edu/) is also here for you. You can call 412-648-7930 at any time to connect with a clinician. If you or someone you know is feeling suicidal, please call the University Counseling Center at any time at 412-648-7930. You can also contact Resolve Crisis Network at 888-796-8226. If the situation is life threatening, call Pitt Police at 412-624-2121 or dial 911.

**Disability Services**

If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and [Disability Resources and Services](https://www.studentaffairs.pitt.edu/drs/) (DRS), 140 William Pitt Union, (412) 648-7890, [drsrecep@pitt.edu,](mailto:drsrecep@pitt.edu) (412) 228-5347 for P3 ASL users, as early as possible in the term. DRS will verify your disability and determine reasonable accommodations for this course.

**Religious Observances**

The observance of religious holidays (activities observed by a religious group of which a student is a member) and cultural practices are an important reflection of diversity. As your instructor, I am committed to providing equivalent educational opportunities to students of all belief systems. At the beginning of the semester, you should review the course requirements to identify foreseeable conflicts with assignments, exams, or other required attendance. If at all possible, please contact me (your course coordinator/s) within the first two weeks of the first class meeting to allow time for us to discuss and make fair and reasonable adjustments to the schedule and/or tasks.

**Equity, Diversity, and Inclusion**

The University of Pittsburgh does not tolerate any form of discrimination, harassment, or retaliation based on disability, race, color, religion, national origin, ancestry, genetic information, marital status, familial status, sex, age, sexual orientation, veteran status or gender identity or other factors as stated in the University’s Title IX policy. The University is committed to taking prompt action to end a hostile environment that interferes with the University’s mission. For more information about policies, procedures, and practices, visit the [Civil Rights & Title IX Compliance web page](https://www.diversity.pitt.edu/civil-rights-title-ix-compliance).

I ask that everyone in the class strive to help ensure that other members of this class can learn in a supportive and respectful environment. If there are instances of the aforementioned issues, please contact the Title IX Coordinator, by calling 412-648-7860, or e-mailing [titleixcoordinator@pitt.edu](mailto:titleixcoordinator@pitt.edu). Reports can also be [filed online](https://www.diversity.pitt.edu/civil-rights-title-ix-compliance/make-report/report-form). You may also choose to report this to a faculty/staff member; they are required to communicate this to the University’s Office of Diversity and Inclusion. If you wish to maintain complete confidentiality, you may also contact the University Counseling Center (412-648-7930).

**Academic Integrity**

Students in this course will be expected to comply with the [University of Pittsburgh’s Policy on Academic Integrity](https://www.provost.pitt.edu/info/ai1.html). Any student suspected of violating this obligation for any reason during the semester will be required to participate in the procedural process, initiated at the instructor level, as outlined in the University Guidelines on Academic Integrity. This may include, but is not limited to, the confiscation of the examination of any individual suspected of violating University Policy. Furthermore, no student may bring any unauthorized materials to an exam, including dictionaries and programmable calculators.

Substantial learning occurs when students help one another to understand the core concepts of the course material.  We encourage students to discuss the content of the course in ways that will improve understanding without violating academic integrity.  Reasonable interactions around the course content include:

* Discussing assignments and course material
* Helping a classmate find a bug in their code.
* Using online resources to solve assignments, provided that they are not solutions to the assigned problems.
* Showing your program to a classmate to help you find a problem in your code.
* Whiteboarding solutions to assignments with others using diagrams or pseudocode but not actual code.
* Discussing other assignments in general terms, engaging in debates on ideas

On the other hand, the following activities are not appropriate instances of collaborative learning:

* Viewing a classmate's solution in order to solve your assignment
* Giving your assignment solution to another student
* Starting with someone else's code or writing and making changes to personalize it

If you have any doubts about whether a particular action may be construed as cheating, ask the instructor for clarification before taking such action. Cheating in this course will result in a report to the appropriate school and/or university authority. The instructor will impose a grade of 0 for the assignment in question, and additional sanctions may be imposed by school or university authorities.

Please read, understand, and abide by the [Academic Integrity Policy](https://sci.pitt.edu/current-students/policies/academic-integrity-policy/) for the School of Computing and Information. To learn more about Academic Integrity, visit the [Academic Integrity Guide](http://pitt.libguides.com/academicintegrity/)

[Links to an external site.](http://pitt.libguides.com/academicintegrity/) for an overview of the topic. For hands- on practice, complete the [Understanding and Avoiding Plagiarism tutorial](http://pitt.libguides.com/academicintegrity/plagiarism)

[Links to an external site.](http://pitt.libguides.com/academicintegrity/plagiarism).

**Course Communications**

The course staff will periodically post updates to the course Canvas page. It is each student’s responsibility to regularly monitor these updates.

Students should check their Pitt email at least once per day to ensure individual communications from course staff are received in a timely manner.

When contacting the course staff via email, prefacing the subject line with “[CMPINF 0010]” will ensure that your message stands out and will help ensure a timely response.

**Lecture Attendance**

Students are encouraged to attend all lectures, which frequently include material that is not directly taken from the readings. If a student misses a lecture, they are still responsible for the material covered and are advised to acquire notes from a classmate.

**Respectful Discussion**

This course may include open discussion or other interactions among students. To allow all participants to express their viewpoints, all discussion must remain civilized and respectful, and participants must avoid comments and behaviors that disparage others. A student who feels their viewpoints are not being respected is encouraged to contact the instructor, who will work to correct the situation without revealing the student’s specific concerns to the rest of the class. A student in this situation who does not feel comfortable contacting the instructor directly is encouraged to contact the TA, who will uphold the same degree of confidence in relaying the issue to the instructor.

**Audio/Video Recordings**

To ensure the free and open discussion of ideas, students may not record lectures, discussion or other course activities without the advance written permission of the instructor. Any recording properly approved in advance can be used solely for the student’s own personal use.

**Copyright Notice**

These materials may be protected by copyright. United States copyright law, 17 USC section 101, et seq., in addition to University policy and procedures, prohibit unauthorized duplication or retransmission of course materials.

See [Library of Congress Copyright Office](https://www.copyright.gov/)

[Links to an external site.](https://www.copyright.gov/)and the [University Copyright Policy](https://www.policy.pitt.edu/sites/default/files/Policies/Community-Standards/Policy_CS_03.pdf).

**Late Assignments**

All assignments specify a precise due date and time. **Late assignments will incur a penalty of 0.5% for each hour that the assignment is late.  Assignments will not be accepted more than 48 hours after the original due date**. Students must ensure they understand each assignment’s submission procedure in advance of its deadline to ensure that submission difficulties do not cause an assignment to be rejected.  Please reach out to me directly if an extenuating personal circumstance (e.g., a medical emergency) has impacted your ability to complete an assignment.

**Grade Appeal**

An evaluation grade can be appealed up to two weeks after it has been returned. After this point, no appeals will be considered. The goal of a grade appeal is to ensure a fair and consistent score. Thus, a score will not be adjusted on an issue of partial credit if the awarded points are consistent with the grading policy adopted for the class as a whole.

When appealing a grade, first contact the grader: email (CCing the instructor) for assignments. If the grader does not find any mistakes made in the original grade, and is unable to clarify adequately the reasons for any assessed penalties, directly contact the instructor describing why you feel the assignment was graded unfairly. The entire assignment will be re-graded by the instructor, so the score may increase, remain the same, or even decrease.